EXHIBIT G

IN THE UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

MIKE HARRIS and JEFF DUNSTAN, individually and on behalf of a class of similarly situated individuals,)))))	
Plaintiffs,))	
-vs-))	No. 1:11-cv-5807
COMSCORE, INC., a Delaware corporation,))))	Judge Holderman Magistrate Judge Kim
Defendant.))	

The deposition of ROBERTO TAMASSIA, Ph.D.,
called by the Plaintiffs for examination, pursuant to
notice and pursuant to the Federal Rules of Civil
Procedure for the United States District Courts
pertaining to the taking of depositions, taken before
Emily R. Pellegrino, Certified Shorthand Reporter and
Notary Public within and for the County of Cook and
State of Illinois, at 350 North LaSalle Street, 13th
Floor, Chicago, Illinois, commencing at the hour of
9:29 a.m. on the 14th day of December, A.D., 2012.

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APPEARANCES:
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ALSO PRESENT:
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          I N D E X

WITNESS   EXAMINATION

ROBERTO TAMASSIA, Ph.D.

   By Mr. Givens   4

          E X H I B I T S

TAMASSIA
DEPOSITION EXHIBIT   MARKED FOR ID
   No. 1   4
   No. 2   76
   No. 3   79
   No. 4   81
   No. 5   83

                (Witness duly sworn.)
            ROBERTO TAMASSIA, Ph.D.,
called as a witness herein, having been first duly
sworn, was examined and testified as follows:
                EXAMINATION
BY MR. GIVENS:
    Q. Good morning, Roberto.
    A. Hi.
    Q. My name is Chandler Givens, this is my
colleague Ben Thomassen, and one of our law clerks
Amir Missaghi who's sitting in today.
    A. Okay.
    Q. I read in your expert report that you
haven't testified at deposition or trial in the past
four yours. Have you ever sat for a deposition
before?
    A. I have never sat for a deposition.
    Q. Okay. So I'm going to layout some ground
rules just to help you understand what's going on
here.
    A. Sure.
    Q. Everything you say is on the record today,
so I need you to give verbal answers. So if you nod
your head or shrug your shoulders or point a finger

---

at me, she's not going to be able to pick this up.
    A. Okay.
    Q. So that's one. The second thing is if you
don't understand one of the questions that I'm asking
you, just ask for a clarification, that's fine. But
if you don't, then I'm going to assume you understand
the question. Your counsel Stephen might object, but
you are required to answer unless he instructs you
otherwise.
        Are you on any medications, substances, or
do you have any health issues that might prevent you
from understanding the questions that I'm going to
ask you today and responding?
    A. No.
                (Whereupon, Tamassia Deposition
                 Exhibit No. 1 was marked for
                 identification, ERP.)
BY MR. GIVENS:
    Q. Let's begin here. I'm handing you what has
been marked as Tamassia Exhibit 1 which is your
expert report. You'll be familiar with it.
    A. Yes.
    Q. Do you recognize this document?
    A. Yes. Right.

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1   MR. SWEDLOW: Objection, vague.
2   You can answer.
3   THE WITNESS: I would like to speak about
4   the computer user that is identified in the ULA.
5   Installation process requires the users to be an
6   administrator of the ULA. Administrator with
7   computer has knowledge about installation of programs
8   and installation of program settings. I believe that
9   a user who's an administrator of a computer should be
10   able to understand exactly what is the meaning of, so
11   what is the operation of the software.
12   BY MR. GIVENS:
13   Q. So a general user then?
14   A. A general user who is an administrator.
15   Q. What do you mean by administrator?
16   A. Administrator is a user who has certain
17   privilege rights with respect to installing programs,
18   reviewing programs, and viewing and modifying
19   settings on a computer.
20   Q. Give me an example of an administrator.
21   A. I'm not sure I understand the question when
22   you say example of administrator. I am an example of
23   an administrator, for example. I don't know if that
24   is your question.

1   Q. Can any consumer be an administrator on
2   their computer?
3   A. Are you asking whether any person or -- what
4   do you mean by consumer here?
5   Q. Any person, yes.
6   A. Okay. So not every person on this planet
7   will have the basic understanding of how a computer
8   works to be an administrator. So there is some basic
9   computer skills that are needed in order to be an
10   administrator. Do you want me to elaborate more on
11   this?
12   Q. I'd love for you to elaborate a little bit.
13   A. Well, what I can say is that computer
14   literacy is growing worldwide, especially in the
15   United States, and so a good fraction of the
16   population is likely to have skills of computer
17   administrator.
18   Q. Is every user who installs comScore software
19   an administrator?
20   A. Yes. The software is set up so that if the
21   user logged into the machine is not an administrator,
22   then the installation will not proceed.
23   Q. What happened during the demonstration when
24   Yvonne clicked no when she was showing you how the

1   software was installed?
2   MR. SWEDLOW: Can you read that question
3   back because I wasn't paying attention?
4   (Whereupon, the record was
5   read as requested.)
6   MR. SWEDLOW: I'll object as vague. There
7   is no "no." Do you want to rephrase that question?
8   MR. GIVENS: I don't want to rephrase the
9   question.
10   MR. SWEDLOW: It doesn't make any sense
11   then.
12   THE WITNESS: Can I ask clarification of the
13   meaning by what happens? What do you mean by what
14   happens?
15   BY MR. GIVENS:
16   Q. In your report you write, if a user selects
17   "no" when presented with a dialog box requesting
18   acceptance of the disclosures and ULA, the comScore
19   installation process does not run. During the
20   demonstration, did Yvonne Bigbee click no?
21   A. Now I can answer your question? Okay. I
22   asked to see both what happens when the user agrees
23   and accepts and when the user disagrees and does not
24   accept, and I saw in the administration that when the

1   user does not accept does not agree, the comScore
2   portion of the software is not installed but the user
3   will still be able to install the other software that
4   was bundled together with the comScore software which
5   was the original software that the user attempted to
6   download.
7   Q. During the demonstration, was there only one
8   type of bundled software used?
9   A. Yes. In the demonstration, there was only
10   one type of bundled software.
11   Q. Let's move to the operation section of your
12   report.
13   A. Yes.
14   Q. The basis for this whole section is the
15   demonstration that was given to you at Reston,
16   Virginia; is that correct?
17   A. Yes.
18   Q. Can you explain a few ways that a panelist
19   will be able to determine that comScore software is
20   running on their computer?
21   A. Are you referring with the word "panelist"
22   to a user who has installed the comScore software?
23   Q. Yes.
24   A. There are various reasons, multiple reasons

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1 that will make such -- panelist as copious user to be
2 fully aware that the software is fine. So first of
3 all, this panelist has explicitly accepted the
4 installation such that manner is occurring. Second,
5 the panelist should notice that the tray area of the
6 task bar in the Windows operating system contains an
7 icon associated with the comScore software. This
8 provides an explicit and continuous and persistent
9 indication that the software is running. In
10 addition, whenever the user -- this panelist, this
11 user will look at the list of programs installed,
12 that the software will appear.
13   And then even more, if you look at what is
14 called the task manager, which is a display of the
15 so-called processes, programs running, the comScore
16 software is there. And if one will inspect some
17 settings of the machine or the so called registry,
18 one will see registry keys associated with the
19 software. The primary visual indication is in the
20 system, is in the tray.
21   Q. In the second sentence of the last full
22 paragraph on page four "Uninstallation" you write,
23 based upon my observations of the demonstration and
24 the documentation I reviewed, comScore software can

1 be uninstalled in manner consistent with other
2 Windows based software, and you go on to write,
3 through the add/remove function provided as a part of
4 the Windows operating system.
5   Can you explain your basis for writing in a
6 manner consistent with other Windows based software?
7   A. The Windows operating system includes
8 specifications for developers of applications on how
9 uninstallation should be performed. All applications
10 for the Windows operating system are expected to
11 provide an uninstallation program. And this
12 uninstallation program is the one that will be
13 launched when the user goes to this app within the
14 settings of the computer, called in operation Windows
15 add/remove programs and enter other things. So it is
16 the standard expected way. All applications are
17 expected to provide this functionality.
18   Q. In your experience, have you seen consumer
19 software that adds an item to a user start menu that
20 is an icon to uninstall software; are you familiar
21 with that?
22   A. I am perfectly familiar with what you're
23 saying and, yes, I have seen some software
24 applications that provide the uninstall functionality

1 additionally through the start menu.
2   Q. What methods do you use to verify that all
3 components of the comScore software have been removed
4 from the machine?
5   A. I asked to show me the locations within the
6 file system and within the registry where traces of
7 the installation would have been present if it were
8 not complete. And through the inspection, so I asked
9 Yvonne who showed me the registry to show me certain
10 folders on the computer, and there were no files that
11 indicated that the program still existed.
12   In addition, I asked about various details
13 of the operation of the software. And based on what
14 I was told, it is my opinion that no files associated
15 with the tracking were left in the file system.
16 There was a portion of my report where I mentioned
17 that the filtering and trackings performed in
18 internal memory, so there is kind of no log files, no
19 log files that will be part of the file system.
20   Q. But you never personally checked the
21 computer; you relied upon Yvonne Bigbee's
22 demonstration?
23   A. The screen of the computer was projected in
24 front of me and Yvonne did exactly what I asked her

1 to do. So I considered this equivalent to myself
2 having inspected the files. Unless, of course, some
3 trick was set up to show me something else.
4   Q. What tool did you use to use the registry?
5   A. I asked Yvonne to show me the registry and
6 she used a standard tool called reg edit.
7   MR. SWEDLOW: A what?
8   THE WITNESS: Reg edit, R-e-g, e-d-i-t.
9 BY MR. GIVENS:
10   Q. Backing up for just a second on the same
11 page the third full paragraph from the bottom last
12 sentence you write, moreover, every user who provides
13 his or her e-mail address during installation of
14 comScore software, it sends an e-mail that includes
15 the ULA. What's your basis for that sentence?
16   A. The question I asked and the answer I
17 obtained.
18   Q. Okay. Let's move to the obfuscation
19 section. Can you explain to me what regular
20 expressions are?
21   A. Regular expression is a standard mechanism
22 for describing in a succinct way a collection of text
23 strings. Text string is a sequence of characters.
24 Regular expression can by informally viewed as text

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 1   pattern. For example, a regular expression will
 2   describe succinctly the form of a Social Security
 3   number, of a phone number, of a ZIP code, of a
 4   two-digit abbreviation of a state. That's it.
 5   Q. When you write that the software uses a
 6   computational technique called regular expressions to
 7   check for the presence of text patterns associated
 8   with sensitive data, who determines what those text
 9   patterns are?
10   MR. SWEDLOW: In the report? Objection,
11   vague.
12   THE WITNESS: Yeah, I actually do not
13   understand your question about who determines.
14   BY MR. GIVENS:
15   Q. Let me ask generally. If you're using
16   regular expressions to detect the presence of text
17   pattern, who is that determines the text pattern; is
18   it the programmer?
19   A. The process for creating the regular
20   expression should be based on domain knowledge about
21   how the text patterns look like and then the
22   programmer will now implement this domain knowledge
23   in the specific program language for the regular
24   expressions. So someone, for example, who knows

 1   about the form of the Social Security numbers will
 2   determine how the pattern looks like. And then the
 3   programmer will have to create what is the actual
 4   programming specification of the regular expression.
 5   Q. So at comScore, who is the person who
 6   determines that?
 7   A. I did not ask who is the person. I assumed
 8   that they have domain experts who have this knowledge
 9   and I know that it is the software developers under
10   the leadership of the CDO and the director of
11   technology and video technology who implement in this
12   programming language of regular expressions what is
13   this domain knowledge.
14   Q. When you write in your report that sensitive
15   data is transformed through the obfuscation process,
16   what do you mean by transformed?
17   A. What I mean is that there is a matter that
18   takes as input data and could use as output some
19   other data; that is the transformation process.
20   Q. So is the comScore software actively seeking
21   Social Security numbers, credit card numbers?
22   A. Yes. The software tries to identify the
23   presence of various types of sensitive data including
24   Social Security numbers and credit card numbers. And

 1   once they are discovered, the software either removes
 2   completely the data or transforms it so that the new
 3   output data cannot be used to reconstruct the
 4   original data.
 5   Q. When you say removes completely, what do you
 6   mean?
 7   A. Removes completely means that the output of
 8   the transformation is the empty data set.
 9   Q. Is the empty data set then sent to
10   comScore's servers?
11   A. There is no such concept of submitting an
12   empty set. The data is suppressed, is not uploaded.
13   Q. Once that type of sensitive information is
14   detected, a credit card number, a Social Security
15   number, a bank number, would it be technically
16   feasible to simply excise that information or not
17   collect it at all?
18   MR. SWEDLOW: I'll object as vague and
19   compound, but you can answer.
20   THE WITNESS: Your question, it is
21   hypothetical about -- so can you rephrase it again?
22   Can you say it to me again so I can understand?
23   BY MR. GIVENS:
24   Q. My understanding of the way the comScore

 1   software works is that it uses regular expressions to
 2   detect some certain information like a credit card or
 3   Social Security number?
 4   A. Yes.
 5   Q. Then it collects that information and
 6   transforms it; those are your words?
 7   A. Yes.
 8   Q. Would it be technically feasible to rather
 9   than collect it and transform it, to detect it, and
10   not collect it at all?
11   A. Of course it is technically feasible to do
12   nothing about the information that is collected, but
13   comScore is in the business of actually acquiring
14   some type of information.
15   Q. Why do you think comScore transforms credit
16   card numbers and collects that information?
17   A. You're asking two questions. Can you ask
18   them separately?
19   Q. Why do you think that comScore actively
20   seeks credit card numbers to collect?
21   A. Yes. My understanding of the comScore
22   business is that they're the one to provide aggregate
23   statistical data to their customers about, for
24   example, the use of certain credit cards for

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1 transactions. So that's one of the reasons that they
2 will track credit card usage across the economy,
3 across the users of the software.
4   Q. Once the comScore software is installed on
5 the user's machine, is it constantly listening for
6 web traffic?
7   A. My understanding is that yes, this is the
8 case.
9   Q. When the comScore software detects
10 information to be collected, how much time elapses
11 between collection and transmission to comScore
12 servers?
13   A. I did not run timing experiments, so I
14 cannot answer this question.
15   Q. When you write in your expert report --
16   MR. SWEDLOW: Are we on page five?
17 BY MR. GIVENS:
18   Q. Page five second full paragraph, once it is
19 identified sensitive data is transformed by an
20 obfuscation process, it aims to remove detailed
21 information while preserving more general information
22 of statistical significance. What do you mean by
23 general information of statistical significance?
24   A. General information means that this

1 information about class of objects, a class of items.
2 For example, the class of days of birth that have the
3 same year or the class of credit card numbers that
4 start with the same seven digits. This is not
5 information about a specific credit card of the user.
6 It is a class of credit cards that include the credit
7 card of the user. That's the meaning of general
8 information.
9   The meaning of statistical significance
10 means that it is relevant to the type of statistical
11 summaries that are provided by the comScore to their
12 customers; for example, demographic information as
13 related to certain types of internet shopping habits
14 or user job certain brands of credit cards for
15 certain types of internet transactions.
16   Q. When you write since the data's transformed
17 by an obfuscation process that aims to remove
18 detailed information, why did you write aims to
19 remove rather than remove? Let me rephrase that.
20   Are you aware of any instances where the
21 software doesn't remove the detailed information?
22   A. The reason why I wrote the sentence with the
23 term aims is because it is the clear intent of the
24 code. And as in any programming endeavors, it is

1 difficult to have absolute certainty of the success
2 of a certain program. In particular, it is
3 unfeasible to try the program on all possible inputs.
4 However, my reading of the software, the description
5 I was given of the techniques and methods indicates
6 that the obfuscation process is based on technically
7 sound principals and was implemented with the
8 appropriate tools.
9   Q. Look with me now at the last sentence of the
10 second full paragraph --
11   A. Uh-huh.
12   Q. -- where you write, in addition, the
13 technique of cryptographic hashing is used to map
14 other sensitive data items to numeric values called
15 digests that have the following properties: (1) with
16 very high probability, the digests are uniquely
17 associated with the items; (2) it is computationally
18 infeasible to reconstruct the items form the digest.
19   What do you mean when you write it is
20 computationally infeasible to reconstruct the items
21 from the digest?
22   A. The meaning is that reversing the
23 transformation is practically impossible to do given
24 current computer technology.

1   Q. Would it be computationally feasible to
2 reconstruct the items from the digest if you were
3 aware of what the values associated with the digest
4 were?
5   A. The question you are asking seems to be of
6 the type if you already know what the value is, can
7 you reconstruct the value from the digest. There is
8 no point in reconstructing something that you already
9 know.
10   Q. Are you familiar with the concept of rainbow
11 tables?
12   A. Yes.
13   Q. So here you write, it's computationally
14 infeasible to reconstruct the items from the digest.
15 But comScore not only has the digest; they also have
16 the associated value, i.e., this is a Social Security
17 number; is that correct?
18   A. ComScore detects -- attempts to detect the
19 presence of Social Security numbers through regular
20 expressions, then Social Security numbers are
21 suppressed, so the transformation actually produces
22 no output value; it produces the empty data set. For
23 Social Security numbers, they do not use the
24 technique of cryptographic hashing.

15 (Pages 54 to 57)

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